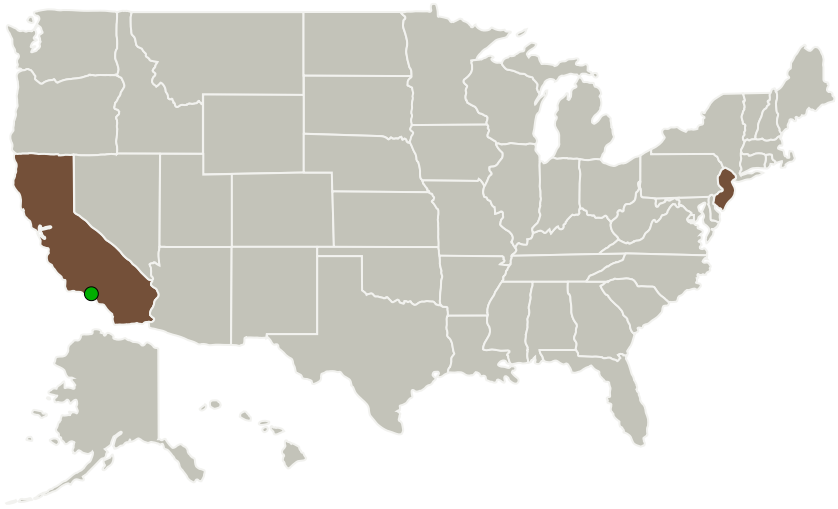
High Energy Density Li-ion Batteries Designed for Low Temperature Applications, Phase I

Completed Technology Project (2010 - 2010)

Project Introduction

NEI Corporation proposes to develop a mixed metal oxide nanocomposite cathode that is designed for delivering high energy density with good rate performance at low temperatures (T=0 C). The two-fold innovation in the proposed effort is the simultaneous intrinsic (i.e. defect chemistry) and extrinsic (electrically conductive surface coating) modification to the active material, which itself is a composite of two layered materials. The proposed intrinsic and extrinsic modifications are projected to beneficially impact both ionic and electronic conductivities of the cathode material, and thereby enhance the Li-ion cell performance at low operating temperatures. The target specific capacity of the proposed cathode is more than 300 mAh/g with a nominal working voltage of 3V, and delivering more than 900 Wh/kg specific energy at T=0 C. The objective of the Phase I program is to demonstrate the feasibility of a new high capacity and high voltage cathode material for rechargeable Li-ion batteries. In Phase II, the composition and morphology of the powders will be optimized, and integrated into large format prototype Li-ion batteries by working in partnership with a battery manufacturer(s).

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
NEI Corporation	Lead Organization	Industry Small Disadvantaged Business (SDB)	Piscataway, New Jersey
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	New Jersey

Project Transitions

January 2010: Project Start

July 2010: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/140110)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

NEI Corporation

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

Nader Hagh

Co-Investigator:

Nader Hagh

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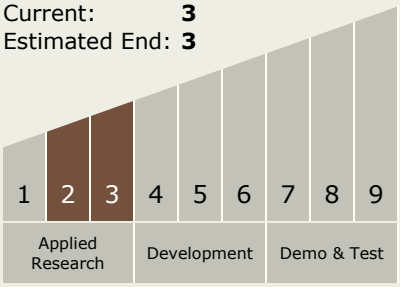
Technology Maturity (TRL)

Start: **2**
Current: **3**
Estimated End: **3**



Technology Areas

Primary:

- TX03 Aerospace Power and Energy Storage
  - TX03.2 Energy Storage
    - TX03.2.1 Electrochemical: Batteries

Target Destinations

The Moon, Mars, Outside the Solar System, The Sun, Earth, Others Inside the Solar System